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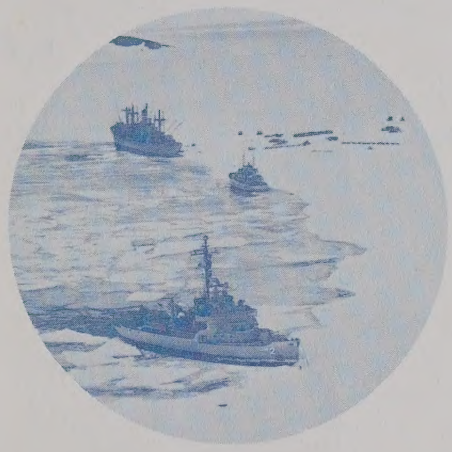

SUPPORT FOR SCIENCE ANTARCTICA

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SUPPORT FOR SCIENCE, ANTARCTICA

Credits

Commander, U.S. Naval Support Force, Antarctica, has compiled and prepared the material for this complete revision of Support For Science, Antarctica, a publication originally dated June 1964 and issued by the U.S. Antarctic Projects Officer. Unless otherwise noted, all photographs appearing in this publication are official U.S. Navy photographs. Gratitude is expressed to the manufacturers for their aid in collecting specifications, and to the National Science Foundation for information and photographs which have been incorporated into this publication. The U.S. Weather Bureau and the U.S. Geological Survey provided assistance in collecting data on stations.

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FOREWORD

This publication is a revision of Support for Science, Antarctica issued by the U. S. Antarctic Projects Officer in June 1964, and originally published as a supplement to the Bulletin of the U. S. Antarctic Projects Officer, Volume II, No. 1, September 1960. The purpose is to provide basic information together with photographs of the principal U. S. stations, aircraft, ships, and vehicles used to support United States' Antarctic activities. Because of their overall contribution to the U. S. program in the Antarctic, New Zealand ships (HMNZS) are included in the SHIPS section of this publication.

Since the beginning of DEEP FREEZE I in 1955, the Department of Defense has exercised responsibility for logistic activities in Antarctica. The United States Navy, as agent for the Department of Defense, has assumed the major share of the burden. Contributions by the U. S. Coast Guard, the Army, and the Air Force have been significant over these many years. Personnel of the Marine Corps and Public Health Service have participated in the operation as well as those from the Army, Navy, and Air Force.

The National Science Foundation, through the Office of Antarctic Programs, funds and manages the scientific program. As part of the program, it furnishes scientific equipment, including tents, supplies, and vehicles particular to the needs of the scientists, which are used by field parties and on scientific traverses.

The ships, aircraft, and vehicles described in this publication are those employed in the Antarctic area. Support items operating between the United States and New Zealand are not included. For each item general data are provided to show differences in nature and capabilities. It must be stressed that in many cases special modifications have been made to individual items so that no single specification may be correct for an entire family of aircraft, ships, or vehicles. Although this publication is accurate for general comparisons, it is recommended that reference be made to technical publications, actual measurements, or to operator personnel in resolving questions of detail about individual items.

The information on stations contains location and weather data, brief historical sketches, and basic construction facts. The stations are those occupied during DEEP FREEZE 65 (1964-1965 season).

It is hoped that this publication will prove useful to visitors, students, and general readers who wish to know something of the stations and equipment which they may see or about which they may read.

STATIONS

AMUNDSEN-SCOTT SOUTH POLE

Established at the South Geographic Pole, named for the first men to reach this location, Roald Amundsen and Robert F. Scott, this station is one of the original IGY scientific sites. The first construction party landed on 20 November 1956; the station was dedicated on 23 January 1957. Originally built on the surface of the snow, Pole Station gradually disappeared under accumulating snow. To prevent the weight of this snow from crushing the camp, and to provide overhead support for new construction, the station was rehabilitated using the Wonder-Arch concept employed at Byrd Station. Eighteen Americans wintering-over during DEEP FREEZE II (1956-1957) became the first men to live at the South Pole.

The scientific disciplines at Amundsen-Scott South Pole Station include aurora and airglow, glaciology, ionospheric physics, meteorology, cosmic rays, geomagnetism, and seismology.

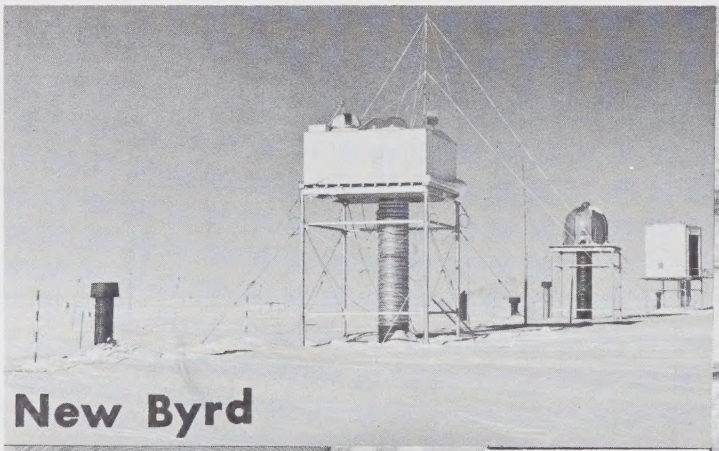
BUILDING SCHEDULE				
NO.	USE	TYPE	SIZE	FL. EL.
1	INCINERATOR VAULT			
2	GALLEY, MESS & RAWIN DOME	CLEMENTS	20x48	
4	UTILITY SHOP	T-5	20x52	
5	HEAD		20x20	
6	COMMUNICATIONS	T-5	20x40	
7	SICK BAY & ADMINISTRATION	T-5	20x52	
8	USARP SCIENCE BLDG	T-5	20x52	
9	RECREATION, POST OFFICE & SHIPS STORE	T-5	20x52	
10	USARP BARRACKS		20x52	
11	FUEL CACHE #1	W. ARCH	30x240	
12	BARRACKS	T-5	20x20	
13	FUEL CACHE #2	W. ARCH	30x240	
14	FOOD CACHE	W. ARCH		
15	COSMIC RAY BLDG	T-5	20x20	
16	NRL BLDG			
17	DOBSON BLDG			
18	VARIATIONS BLDG		28x40	
19	ABSOLUTE BLDG			
20	SEISMOGRAPHIC BLDG			
21	SEISMO RECORDING BLDG			
23	USARP GARAGE			
24	VLF BLDG			
27	GENERATOR BLDG			
28	HARRINGTON HUT			
A	GARAGE			
B	HYDROGEN GEN. BLDG.			
C	BALOON INFLATION BLDG.			

PLOT PLAN
POLE STATION
ANTARCTICA
CONDITIONS AS OF DF 65

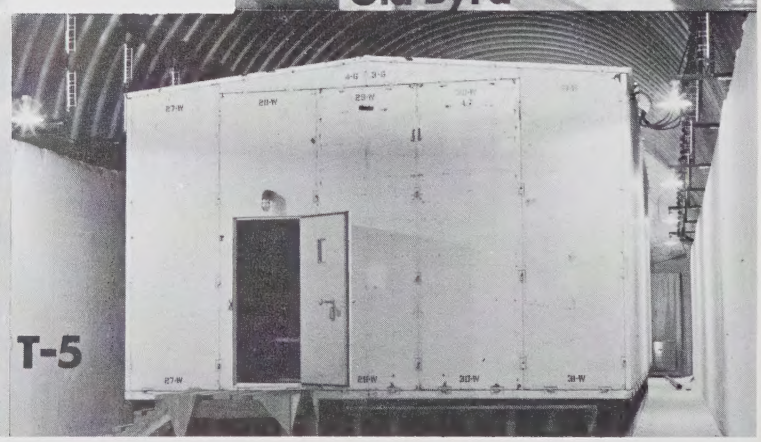
BYRD

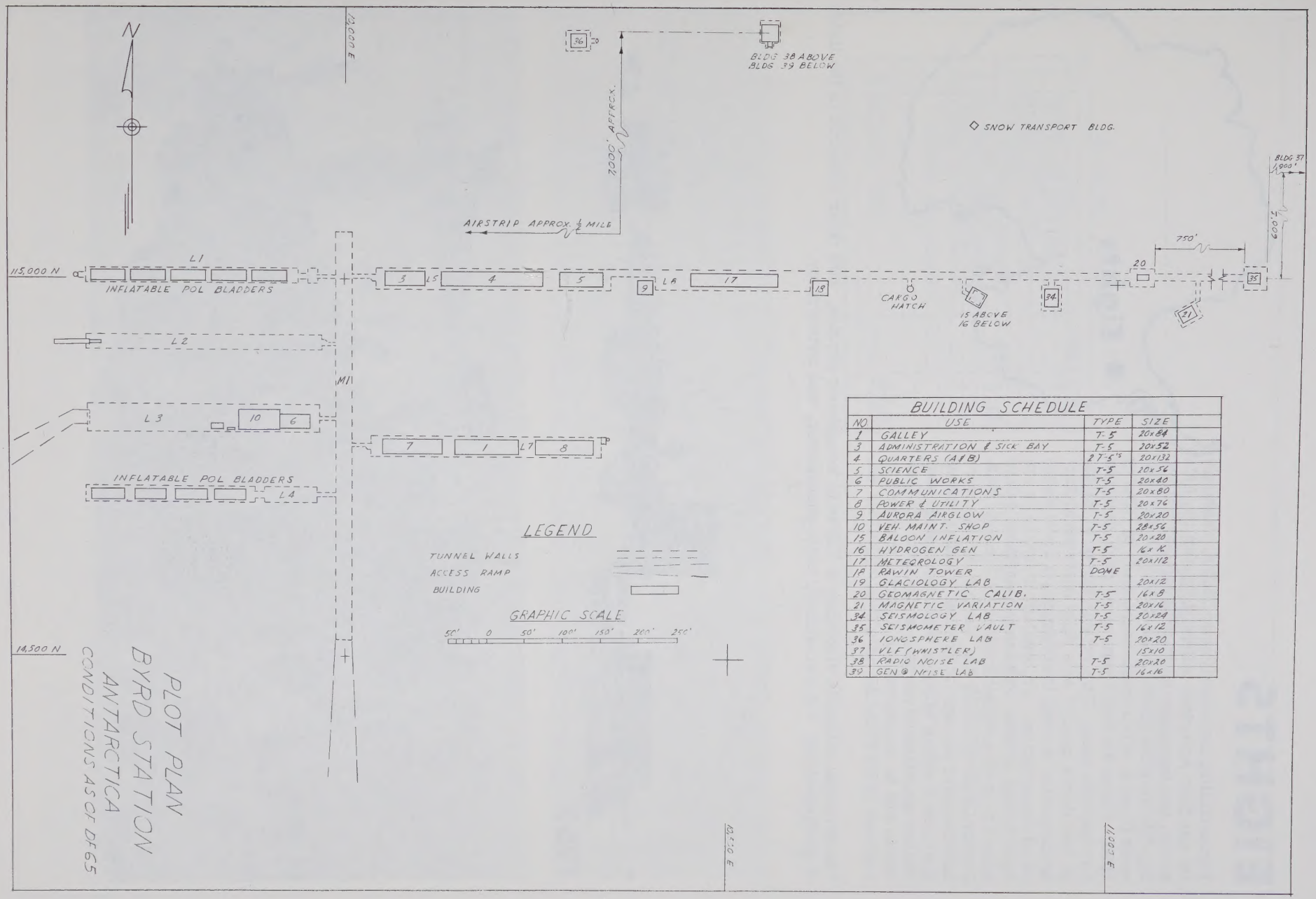
The present Byrd Station, also called new Byrd Station, was commissioned on 13 February 1962. The original Byrd IGY Station, commissioned on 1 January 1957, was threatened with collapse from the weight of snow accumulated over the years. With the danger recognized, excavation for a new station began in 1960 at the present site, a distance of about 6 miles from the original IGY location. The new station is made of T-5 prefabricated, insulated buildings in man-made trenches covered with steel Wonder-Arches and snow. The entire camp is below the surface, except for necessary scientific structures. A system of tunnels connects the many trenches. This construction concept was developed and tested by the U.S. Army at Camp Century in Greenland. Built inland in Marie Byrd Land, and named for RADM Richard E. Byrd, this station supports the largest inland scientific program. In addition, Byrd serves as a staging area for scientific parties in West Antarctica.

Scientific disciplines include aurora and airglow, ionospheric physics, meteorology, seismology, geomagnetism, glaciology, and radio sciences.


New Byrd

Old Byrd


T-5



BUILDING SCHEDULE

NO	USE	TYPE	SIZE
1	GALLEY	T-5	20x84
3	ADMINISTRATION & SICK BAY	T-5	20x52
4	QUARTERS (A&B)	27-5'S	20x132
5	SCIENCE	T-5	20x56
6	PUBLIC WORKS	T-5	20x40
7	COMMUNICATIONS	T-5	20x80
8	POWER & UTILITY	T-5	20x76
9	AURORA AIRGLOW	T-5	20x20
10	VEH. MAINT. SHOP	T-5	28x56
15	BALOON INFLATION	T-5	20x20
16	HYDROGEN GEN	T-5	16x16
17	METEOROLOGY	T-5	20x112
18	RAWIN TOWER	DONE	
19	GLACIOLOGY LAB		20x12
20	GEOMAGNETIC CALIB.	T-5	16x8
21	MAGNETIC VARIATION	T-5	20x16
34	SEISMOLOGY LAB	T-5	20x24
35	SEISMOMETER VAULT	T-5	16x12
36	IONOSPHERE LAB	T-5	20x20
37	VLF (WHISTLER)		15x10
38	RADIO NOISE LAB	T-5	20x20
39	GEN @ NOISE LAB	T-5	16x16

5
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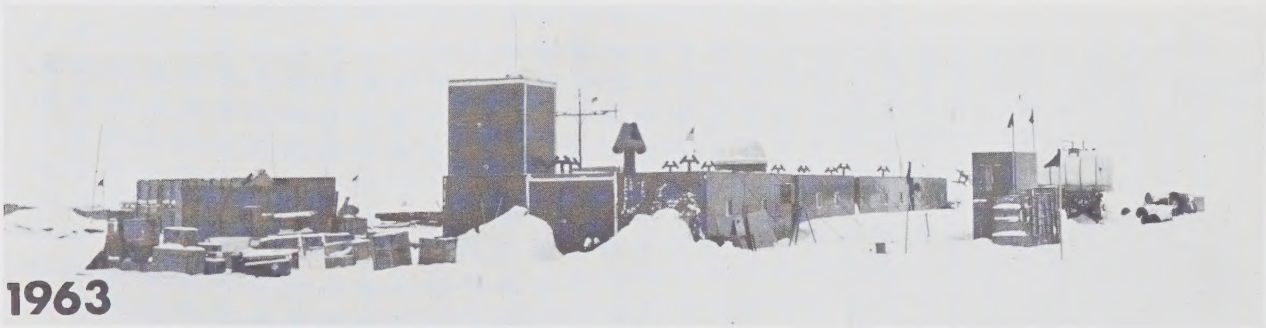
EIGHTS

Eights Station, named for James Eights, a naturalist and first American scientist to visit the Antarctic, was begun near an existing summer station, Sky-Hi, when the first of 11 air-transportable vans were flown in with a construction crew in January 1963. These 8'x8'x27' vans were each designed for specific uses. The establishment of Eights in less than a month as a fully operational Antarctic station marked the beginning of a new method of construction. An overland traverse from Byrd Station arrived with heavy equipment 4 days after formal establishment on 27 January 1963. During DEEP FREEZE 65, Wonder-Arches were installed over the camp to prevent possible losses due to the crushing effect of the accumulated snow. Station operations at the base of the Antarctic Peninsula will be suspended for a period expected to run from DEEPFREEZE 66 to DEEPFREEZE 68.

The principal scientific discipline at Eights is ionospheric physics, with other research in the fields of geomagnetism, auroral studies, radio phenomenon, and meteorology.

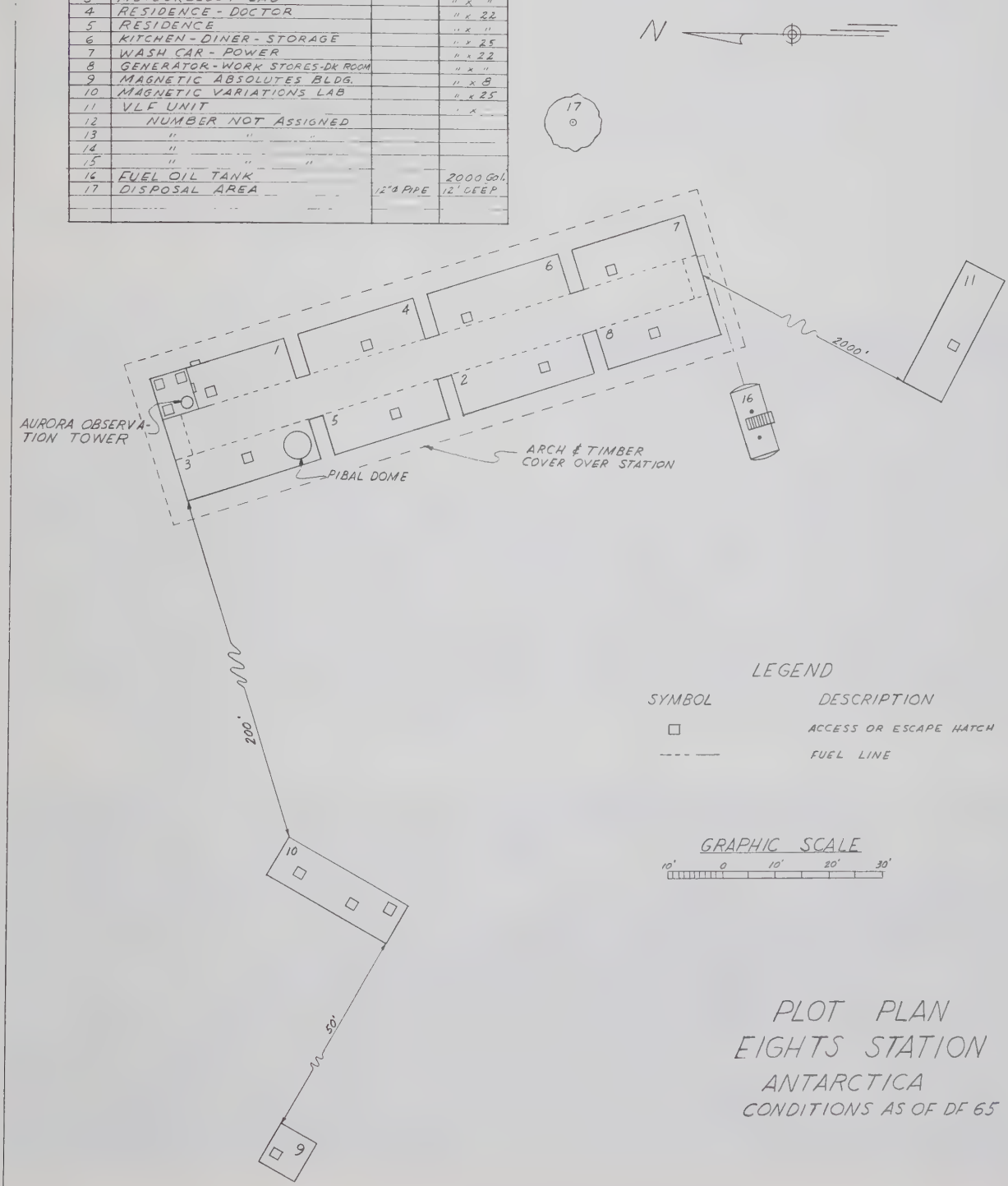

1963

1965

EDGE OF RUNWAY

BUILDING SCHEDULE

NO.	USE	TYPE	SIZE
1	AURORA LAB & COMMUNICATIONS		7.8 x 25.5
2	IONOSPHERE LAB & STORAGE		" x "
3	METEOROLOGY LAB		" x "
4	RESIDENCE - DOCTOR		" x 22
5	RESIDENCE		" x "
6	KITCHEN - DINER - STORAGE		" x 25
7	WASH CAR - POWER		" x 22
8	GENERATOR - WORK STORES - DK ROOM		" x "
9	MAGNETIC ABSOLUTES BLDG.		" x 8
10	MAGNETIC VARIATIONS LAB		" x 25
11	VLF UNIT		" x "
12	NUMBER NOT ASSIGNED		
13	" " "		
14	" " "		
15	" " "		
16	FUEL OIL TANK		2000 Gal.
17	DISPOSAL AREA	12" A PIPE	12' DEEP



LEGEND

SYMBOL	DESCRIPTION
□	ACCESS OR ESCAPE HATCH
---- ——	FUEL LINE

GRAPHIC SCALE

10' 0 10' 20' 30'

PLOT PLAN
EIGHTS STATION
ANTARCTICA
CONDITIONS AS OF DF 65

HALLETT

Hallett Station, one of the original IGY stations, was operated jointly with New Zealand from 1957 to 1965. Scientific leadership rotated between the two countries, but the U.S. Navy provided the common support. Initially called Adare Station, and planned to be established on Cape Adare, the final location for the station was Cape Hallett (for Thomas R. Hallett, purser on Ross' EREBUS) on Moubray Bay. Some 8,000 penguins were ejected from the site before the construction of a permanent, above-ground station was completed during January 1957. Hallett Station was operated as a year-around station until DEEP FREEZE 65 when it became a summer only operation. Hallett is also a communications and weather reporting station on the flying route between Christchurch, New Zealand and McMurdo Station.

Scientific disciplines have been aurora and airglow, biology, geomagnetism, cosmic rays, meteorology, and seismology.

BUILDING SCHEDULE

NO.	USE	TYPE	SIZE
1	QUARTERS & SICK BAY	T-5	20 x 56
2	AEROLOGY	T-5	20 x 22
3	HEAD	T-5	20 x 16
4	GARAGE & UTILITIES	SPECIAL	IRREG
5	KAWIN DOME	T-5	20 x 34
6	AERO INFLATION SHELTER	SPECIAL	IRREG
6-A	UTILITY	SPECIAL	IRREG.
8	GEOMAGNETIC	SPECIAL	B/A
9	SEISMOGRAPH	SPECIAL	10 x 12
11	LIVING QUARTERS	SPECIAL	16 x 24
12	GALLEY & MESS HALL	T-5	20 x 44
13	GEOGRAPHIC & BIO. LAB	T-5	20 x 44
14	COMMUNICATIONS	T-5	20 x 52
15	PASSAGEWAY / ELECTRONICS SUPPLY	SPECIAL	6 x 25
16	LIVING QUARTERS	SPECIAL	IRREG.
17	ELECTRONICS STOREROOM	JAMESWAY	16 x 24
18	WAREHOUSE NO. 1	QUONSET	40 x 100
19	WAREHOUSE NO. 2	QUONSET	40 x 100
27	LIVING QUARTERS	JAMESWAY	16 x 16
31	SPARE GENERATOR ROOM	SPECIAL	5 x 10
AA	NEW ZEALAND GEOMAGNETIC	SPECIAL	8 x 8
BB	COSMIC RAY	SPECIAL	8 x 24
CC	RADIATION BLDG.	SPECIAL	8 x 24
DD	POL TANK	STEEL	48 DIA
EE	POL TANK	STEEL	48 DIA.
FF	GENERATOR BLDG.	T-5	20 x 72
GG	NCEL BARRACKS	T-5	28 x 55
HH	SMALL STORES	—	—

GRAPHIC SCALE

100' 0 100' 200' 300' 400' 500'

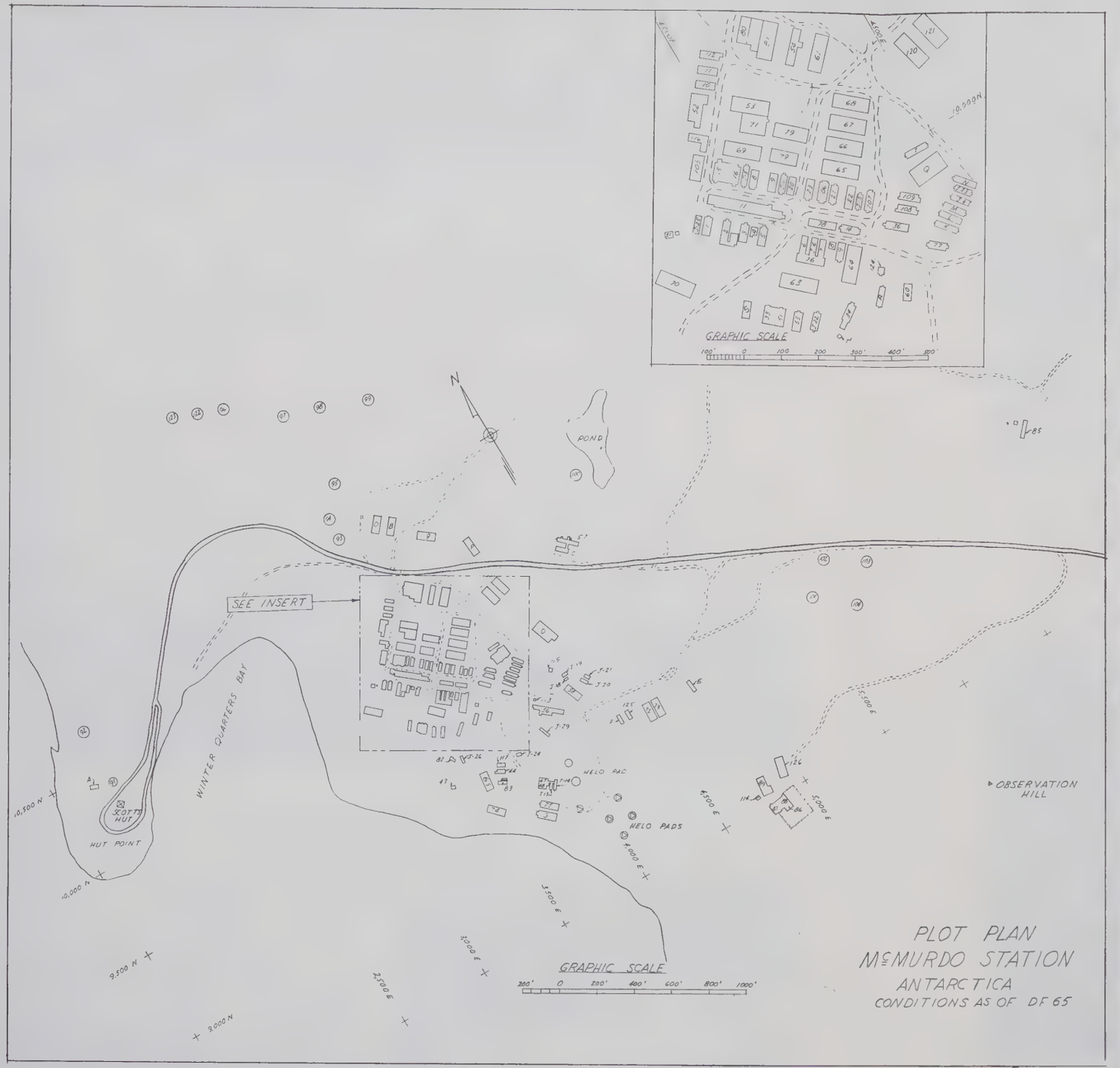
PLOT PLAN
HALLETT STATION
ANTARCTICA

CONDITIONS AS OF DF 65

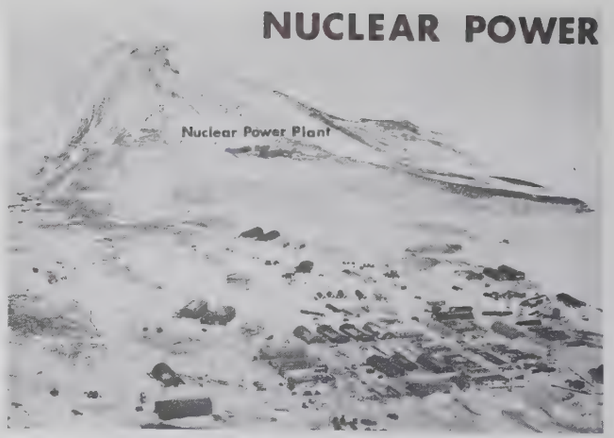
McMURDO

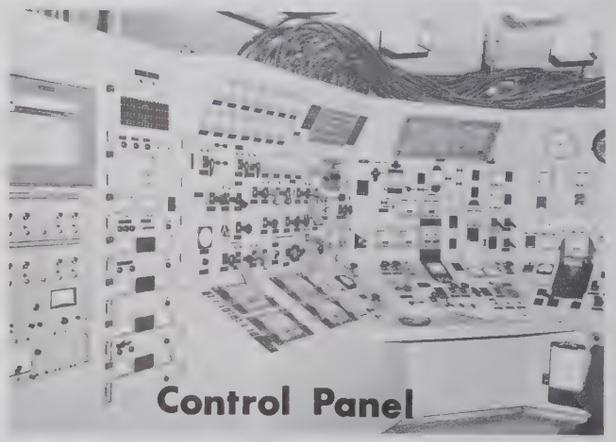
This station, located at Hut Point on Ross Island, is one of the seven original U. S. International Geophysical Year stations. McMurdo, named for McMurdo Sound (originally from LT Archibald McMurdo of Ross' TERROR), was established as a logistic support base with a scientific role added at a later date. Construction of a temporary, above ground station began on 20 December 1955 using a variety of buildings and shelters. The station became operational on 16 February 1956. When the Navy's role in Antarctica was extended for an indefinite period, it became necessary to improve the facilities at the station. In 1962 a nuclear power plant was installed at McMurdo making it the only Antarctic station with this type energy. Future design contemplates consolidation of many structures into fewer multi-story permanent buildings. The construction of these new buildings, begun in DEEP FREEZE 64, will continue into future years. McMurdo, considerably larger than other U. S. stations, has a summer influx of as many as 1,000 persons to receive and distribute supplies, to construct and improve facilities, and to operate the very important air facility at Williams Field.

Biology and meteorology are the primary scientific disciplines at McMurdo Station. Others are cosmic rays, ionospheric physics, and glaciology.



NUCLEAR POWER





PM-3A

ELLIOTT QUAY The ships in Winter Quarters Bay are:
USCGC EASTWIND (top)
USNS WYANDOT (center)
USS STATEN ISLAND (bottom)
Note also the graded road to Hut Point.

Antarctica's long winter night.

PALMER

The most recent member of the U.S. Antarctic community, Palmer Station is built on Anvers Island, along the west coast of the Antarctic Peninsula. Named after an early Antarctic sealer, Nathaniel Brown Palmer, the station was commissioned on 25 February 1965. A temporary camp was built using a prefabricated N-2 building and a converted British hut built in 1955 and then left idle after 3 years occupancy. The new construction was supported entirely by ship as there are no air facilities at the station. A larger station is expected to be built in the vicinity using multi-story, prefabricated buildings.

Although biology is the principal scientific discipline, geological, glaciological, and meteorological studies are made.

looking N.E.

looking W.

British Hut

CH-19 lifts supplies

WILLIAMS FIELD

Williams Field, located on the Ross Ice Shelf in McMurdo Sound, is named for Richard T. Williams, CD3, who died when his tractor plunged through the ice of McMurdo Sound during DEEP FREEZE I. Williams Field is a temporary facility using Jamesway and van type shelters. The entire system of ice runways and skiways is built on the bay ice. The field has been relocated frequently to prevent the loss of equipment threatened by breakout of the sea-ice runway. Relocation occurred as late as DEEP FREEZE 65. There are facilities at the field to refuel aircraft with aviation gas and JP-4, a building complex to house and feed operating personnel, and a limited shop area for aircraft.

WEATHER STATIONS

Summer weather stations are established each year to provide meteorological information along the primary flight paths from Williams Field to Byrd and to Pole Stations. The locations and the names change. These two stations were used during DEEP FREEZE 65. Composed of air-transportable vans, these stations provide facilities for up to 6 men during summers only.

LITTLE ROCKFORD	Latitude 79°14'S.	LITTLE JEANA	Latitude 81°23'S.
Established for DFIV	Longitude 147°29'W.	Established for DF65	Longitude 170°45'E.

LITTLE ROCKFORD

Station Statistics

LOCATION AND CLIMATE DATA SUMMARY

DATA		STATIONS					
		Amundsen-Scott South Pole	Byrd	Eights	Hallett	McMurdo	Palmer
LATITUDE:		90°00'S.	79°59'S.	75°14'S.	72°18'S.	77°51'S.	64°45'S.
LONGITUDE:		xxx	120°01'W.	77°10'W.	170°18'E.	166°37'E.	64°05'W.
ELEVATION:	Feet	9,184	4,971	1,500	16	102	25
	Meters	2,800	1,515	458	5	31	8
ANNUAL MEAN TEMPERATURE:	°C.	- 49.2	- 28.2	- 27.0	- 15.5	- 17.7	est 0.0
	°F.	- 56.6	- 18.8	- 16.6	+ 4.2	+ 0.2	+ 32.0
EXTREME LOW TEMPERATURE:	°C.	- 80.7	- 68.2	- 61.1	- 47.8	- 50.6	- 26.0
	°F.	-113.2	- 81.8	- 78.0	- 54.0	- 59.5	- 14.8
EXTREME HIGH TEMPERATURE:	°C.	- 14.7	- 0.8	+ 2.2	+ 8.3	+ 5.5	+ 9.8
	°F.	+ 6.0	+ 31.0	+ 36.0	+ 47.0	+ 41.9	+ 49.5
PREVAILING WINDS:	Direction	NNE	NNE	S	SW	E	NNE
	Speed in knots	12.6	16.4	10.0	7.0	12.2	7.0
POPULATION: (Winter average)	Military	11	15	6	Summer	151	4
	Civilian	9	12	5	Only	8	5
AIR DISTANCE FROM McMURDO: (Statute miles)		820	885	1,525	380	xxx	2,360

STATION POPULATION HISTORY
Austral Winters only
Military (M) and Civilian (C)

STATION		DF I	DF II	DF III	DF IV	DF 60	DF 61	DF 62	DF 63	DF 64	DF 65
AMUNDSEN-SCOTT SOUTH POLE	(M)	0	9	10	9	10	10	11	12	13	14
	(C)	0	9	8	8	8	10	11	9	9	7
BYRD	(M)	0	10	12	10	10	10	22	21	17	19
	(C)	0	13	12	13	11	10	14	15	10	9
EIGHTS	(M)	0	0	0	0	0	0	0	6	6	6
	(C)	0	0	0	0	0	0	0	5	4	5
HALLETT	(M)	0	10	12	12	6	8	12	9	11	0
	(C)	0	4	4	4	11	10	7	9	2	0
McMURDO	(M)	91	87	112	132	131	135	207	206	205	208
	(C)	2	0	0	3	8	10	13	21	10	12
PALMER	(M)	0	0	0	0	0	0	0	0	0	4
	(C)	0	0	0	0	0	0	0	0	0	5

AIRCRAFT

Aircraft Specifications

AIRCRAFT	C-130	C-124	C-121J	C-54	C-117	C-47	U-1B
Wing Span:	132' 7"	174' 0"	123' 0"	117' 6"	90' 0"	95' 0"	58' 0"
Height:	38' 0"	48' 3"	24' 9"	27' 6"	18' 3"	12' 7"	12' 7"
Length:	97' 8"	130' 2"	116' 6"	93'11"	67' 9"	65' 6"	41'10"
Gross Weight (maximum pounds):	@	185,000	145,000	73,000	36,380	30,140	8,100
Range in miles: (average)	@@	2,000	3,580	2,980	1,400	1,200	960
Payload in pounds: (average)	@@@	70,000	34,512	27,000	6,000	5,000	3,000
Passengers	40	N/A	68	N/A	6	8	3-5
Fuel Consumption (gal/hr):	630	N/A	500	200	125	100	33
Fuel Capacity (gallons):	7,150#	11,000	6,570	3,540	1,900	1,600	215
Maximum Speed (MPH):	340	230	360	280	260	221	160
Crew:	6-9	7	10-13	6	5	5	1
Engines:	4	4	4	4	2	2	1
Manufacturer: *	A	B	C	B	B	D	B
Type: **	X	Y	Y	Y	Y	Y	Y
Rating (horsepower):	3,375	3,500	3,250	1,100	1,475	1,200	600
Cargo Compartment Size (stated in cubic feet):	3,700	10,000	3,031	1,190	980	980	286
Maximum size of single cargo unit:	8'6"x9'6" x 36'	11'6"x9' x 77'	9'3"x6'2" x 10'	5'7"x7'9" x 10'	7'x4'7" x 10'	7'x4'7" x 10'	3'10"x3' 9"x6'

* Manufacturers' codes are: A - Allison; B - Pratt & Whitney; C - Wright-Aero; D - Wright.
** Type of engine codes are: X - Turbine; Y - Piston (reciprocating).

\# The LC-130F has an additional fuselage tank capacity of 3,600 gallons.

@ The C-130E gross weight is 155,000 pounds, for the LC-130F, this weight is 135,000 pounds.
@@ Ranges vary. With maximum cargo- 1,500 miles; with maximum fuel- 3,200 miles; with the fuselage tank- 5,740 miles.
@@@ Payload varies with cargo/fuel proportion. With maximum cargo, the payload is 25,000 pounds; with maximum fuel, the payload is reduced to 10,000 pounds.

HELICOPTERS	UH-13	CH-19	LH-34	UH-1B
Wing Span (rotor):	37' 2"	53' 0"	56' 0"	53' 0"
Height:	12' 0"	13' 4"	15'10"	13' 2"
Length:	43' 4"	42' 1"	37' 0"	38' 3"
Gross Weight (average pounds):	2,700	7,500	14,000	6,600
Payload (average pounds):	500	2,250	2,500	2,115
Passengers	1	6-10	9	5-8
Fuel Consumption (gal/hr):	14	45	88	60
Fuel Capacity (gallons):	35	189	205	1,050
Maximum Speed (MPH):	86	117	140	120
Crew:	1	2	3	2
Engines:	1	1	1	1
Manufacturer:	Lycoming	Wright	Wright	Lycoming
Type:	Piston	Piston	Piston	Gas Turbine
Rating (horsepower):	220	700	1,425	1,100
Cargo Compartment Size: (stated in cubic feet)	N/A	300	350	107
Door Opening:	N/A	48"x 48"	48"x 52"	48"x 48"
Range (average miles)	165	310	320	200

C-130

The C-130 Hercules is a turbo-prop, transport aircraft made by Lockheed Aircraft Corporation. It has 2 basic configurations: with tricycle, ski-wheel landing gear, it is designated the LC-130F (formerly the C-130BL), a Navy version, is capable of landing on either concrete, snow, or ice runways or on unimproved snow surfaces; as the C-130E, the Air Force version in support of DEEP FREEZE, the Hercules has standard wheeled configuration. This aircraft is used principally for direct delivery of supplies, but doubles as search and rescue, reconnaissance, and aerial photography aircraft. It is capable of air-drop support.

The Air Force introduced the ski-equipped C-130 during DEEP FREEZE 60. Subsequently the Navy obtained 4 ski-equipped LC-130Fs, a later model, for resupply of the inland stations as an improvement over the tedious overland traverse or the air-drop systems of station resupply. Since DEEP FREEZE 64 the LC-130Fs have been equipped with fuselage tanks for transport and direct delivery of bulk POL products. The tanks can be used as auxiliary fuel tanks when desired, or necessary, for accomplishing flight missions.

C-121J

The C-121J Super Constellation is manufactured by the Lockheed Aircraft Corporation. Equipped only with wheeled tricycle landing gear, the "Connie" aircraft are used for both personnel and logistic flights between United States and New Zealand and operate between Christchurch and McMurdo during the period that the ice-runway at McMurdo is usable. This aircraft is not used for inland type support, although one of the two C-121J planes is equipped for trimetrogon photography and has flown many hours in support of the aerial mapping program.

C-124

The C-124 Globemaster, manufactured by Douglas, were used to airdrop cargo to inland stations prior to the introduction of the LC-130Fs. Since DEEP FREEZE 63, this airplane has been used to lift particularly oversized items, such as the Army UH-1B helicopters, from the United States to McMurdo Station. The C-124s are not ski equipped.

C-54

The C-54 Skymaster is built by Douglas Aircraft Corporation. It participated in DEEP FREEZE for the last time in 1965. Once very important in the movement of personnel and supplies from United States to New Zealand and to the "Ice" when the runway was operable, its usefulness rapidly diminished with the introduction of the larger LC-130F aircraft.

TIBRARY

C-47

C-117

The C-47, manufactured by the Douglas Aircraft Corporation, is used extensively for support of scientific field parties and for a wide variety of medium range logistic and reconnaissance missions. Prior to the advent of the LC-130F, it was the principal aircraft used for direct delivery of personnel and cargo to the inland stations. The LC-117 is an extensively modified, higher performance version of the LC-47.

U-1B

The U1-B "Otter", manufactured by the De-Haviland Corporation of Canada, is a small, general utility type, transport aircraft. Ski-equipped, it is used for short-range logistical delivery, for scientific field party support, and for aerial reconnaissance.

Landing Facilities & NAVAIDS

The aircraft landing facilities and navigation aids listed below are for the stations discussed in this publication. This information is for general use and should not be construed as the facilities which are to be found at all times. Lengths of runways and navigation aids (NAVAIDS) are both subject to change. Palmer Station is not included as there are no air facilities available. The NAVAID list is based on the equipment in place during DEEP FREEZE 65.

AIRCRAFT LANDING FACILITIES

FACILITY	Amundsen-Scott South Pole	Byrd	Eights	Hallett	Weather Stations	Williams Field McMurdo
Ice Runway	None	None	None	6,000' *	None	6,000'
Ice Runway-crosswind	None	None	None	None	None	6,000'
Skiway	14,000'	14,000'	Unimproved	Unimproved	Unimproved	13,000'
Skiway-crosswind	None	None	None	None	None	7,000'

*up to 30 November

NAVIGATION AIDS

NAVAID						
UHF Homer	YES	YES	YES		YES	YES
LF/MF Homer				YES		YES
TACAN	YES	YES				YES
UHF D/F						YES
VHF D/F						YES
GCA (Skiway)	YES	YES				YES
GCA (Runway)						YES

TWO-MAN SURVIVAL KIT
Used by:
Air Development Squadron SIX
(VX-6)

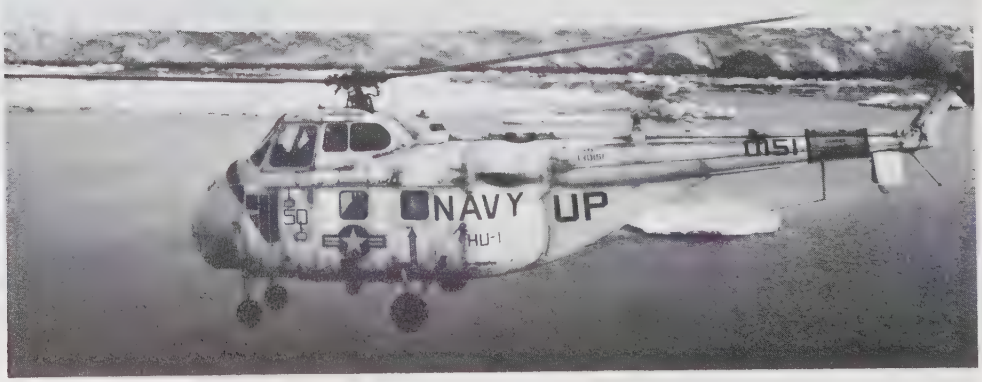
HELICOPTERS

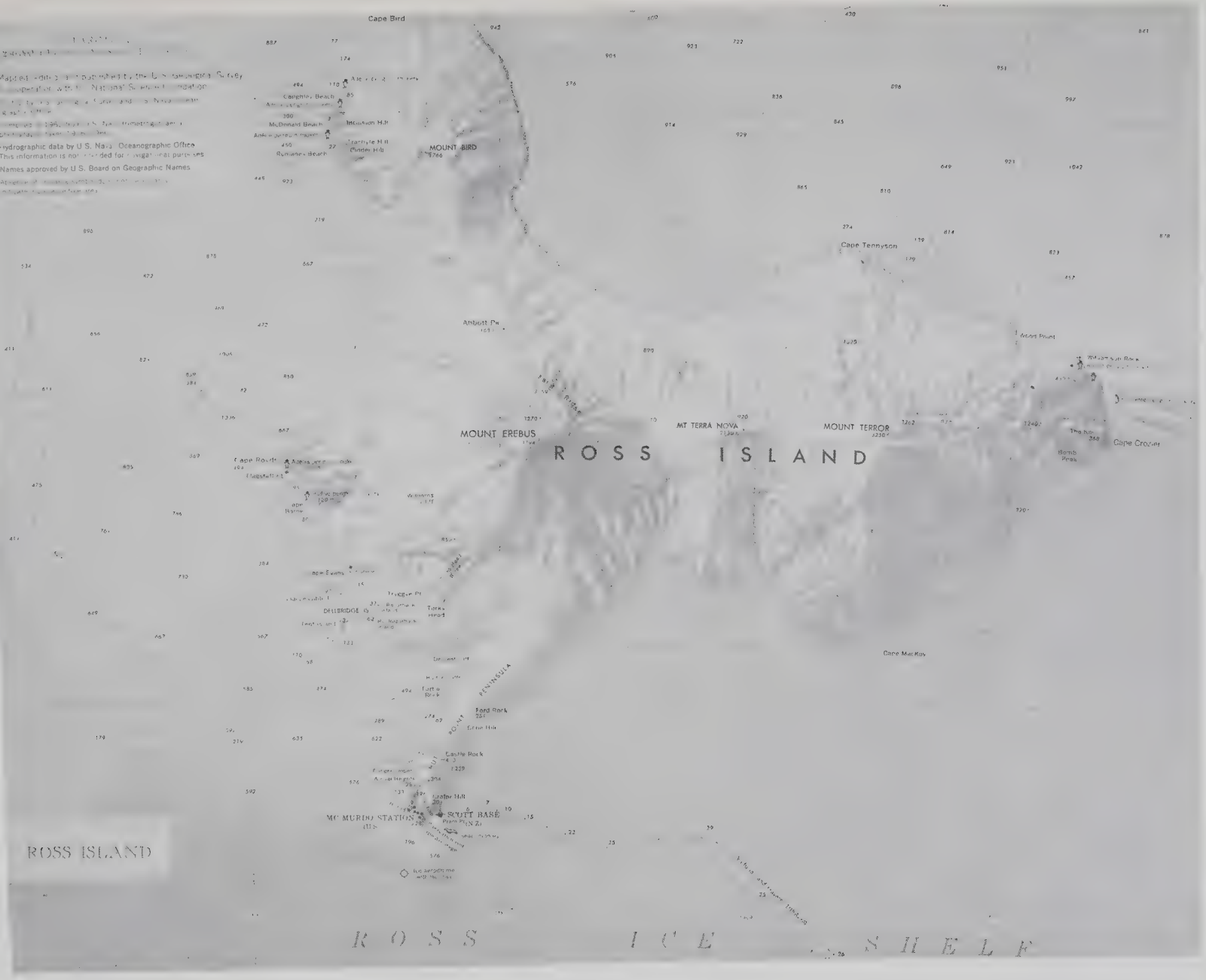
The UH-13 and CH-19 helicopters are based aboard icebreakers. The UH-13 is a reconnaissance aircraft used primarily to locate leads in the ice fields for the ships to follow. The Sikorsky Company's CH-19 is larger than the Bell Helicopter Corporation's UH-13. This larger helicopter is used to haul both cargo and passengers as well as to make reconnaissance flights. The CH-19 contributes significantly to the icebreaker program of science support.

CH-19

UH-13

CH-19




Cape Bird
MOUNT BIRD
Cape Tennyson
MOUNT EREBUS
MT TERRA NOVA
MOUNT TERROR
ROSS ISLAND
Cape Crozier
Cape Royds
Cape Evans
Cape MacKay
MC MURDO STATION
SCOTT BASE
ROSS ISLAND
ROSS ICE SHELF

LH-34

The LH-34 helicopter, formerly designated CH-34E, is made by the Sikorsky Company. It is a land-based utility aircraft which provides many services. In addition to giving field party support, this helicopter is used for McMurdo area reconnaissance, personnel transport, construction support, and light cargo hauling. This is the only VX-6 operated helicopter.

UH-1B

The UH-1B, built by the Bell Helicopter Corporation, is a turbine-powered, utility helicopter. Used primarily in support of topographical and geological survey work, these Army helicopters have made a considerable contribution to the scientific progress in Antarctica. The turbine makes it possible to operate at high altitudes and under extreme temperatures.

SHIPS

ICEBREAKERS

GLACIER Class

TYPE: Designed to provide ice-breaking services and to support logistical and scientific activities in polar areas. The GLACIER class is newest of the U.S. icebreakers and is capable of negotiating ice conditions too severe for the WIND class ships.

CONSTRUCTION: All-welded steel, double thick hull, round bottom and reinforced bow. Deck arrangement includes port and starboard well-decks, helicopter deck and a hanger located aft; she has both aloft and wing conning stations. The ship has a 500-ton hold and heeling tanks, carries 2 helicopters, landing craft, and a Greenland cruiser.

SPECIFICATIONS:

Length:	310 feet (overall)	Displacement:	8,775 tons	Screws:	2
Beam:	74 feet	Propulsion:	Diesel Electric		
Draft:	29 feet	Cargo Capacity:	Varies	Horsepower:	16,900

GLACIER class icebreakers which have participated in DEEP FREEZE operations:
USS GLACIER (AGB-4) I-II-III-IV-60-61-62-63-64-65

WIND Class

TYPE: Icebreaker, designed for escorting cargo ships through ice fields, and is used for limited logistical and scientific support in polar regions.

CONSTRUCTION: All-welded steel hull with round bottom, side plating and ice-cutting bow; has a helicopter deck aft, an aloft lookout station, wing conning stations and heeling tanks. WIND class ships carry landing craft, 2 helicopters and a Greenland cruiser.

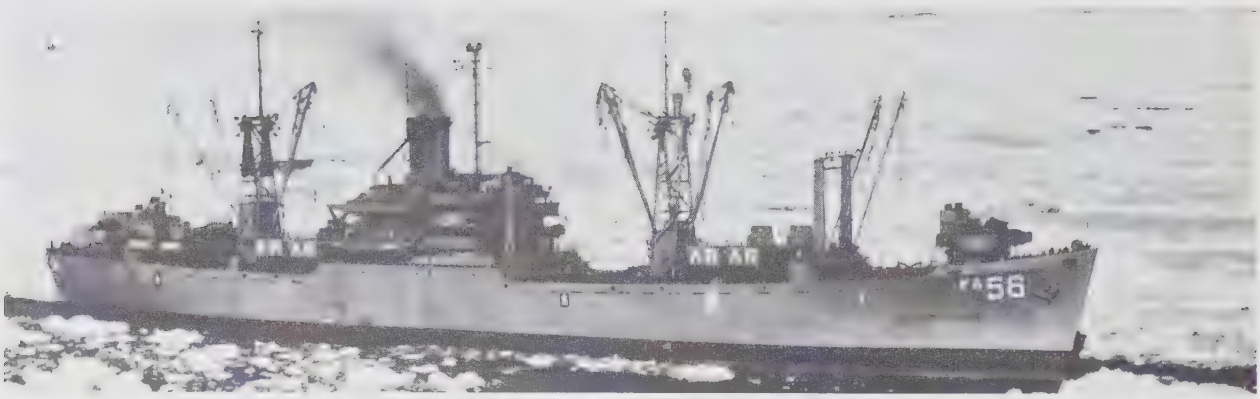
SPECIFICATIONS:

Length:	269 feet (overall)	Displacement:	6,515 tons	Screws:	2
Beam:	64 feet	Propulsion:	Diesel Electric	Horsepower:	16,900
Draft:	29 feet	Cargo Capacity:	Varies		

WIND class icebreakers which have participated in DEEP FREEZE operations:

USS BURTON ISLAND (AGB-1)			III		60	62	64	
USS EDISTO (AGB-2)	I			IV	61	63	65	
USS ATKA (AGB-3)		II	III		60	62	64	
USS STATEN ISLAND (AGB-5)		II		IV	61	63	65	
USCGC EASTWIND (WAGB-279)					60	61	62	63	64	65
USCGC WESTWIND (WAGB-281)			III					
USCGC NORTHWIND (WAGB-282)		II		IV				

CARGO



ANDROMEDA Class

TYPE: Attack Cargo Ship (AKA), transports and lands cargo, equipment, and personnel by using boats carried aboard in ship-to-shore operation or by conventional discharge procedures.

CONSTRUCTION: Vessels of this class which operate in Antarctic waters have been modified with ice-strengthened hull, enclosed lookout station on forecastle and forward masts, and carry a reduced boat group of 6 LCMs. This class ship has a 60-ton boom. The pilot house is located amidships.

SPECIFICATIONS:

Length:	459 feet (overall)	Displacement:	12,800 tons	Screws:	1
Beam:	63 feet	Propulsion:	Steam turbine	Horsepower:	6,000
Draft:	24 feet	Cargo Capacity:	5,200 tons		

ANDROMEDA class ships which have participated in DEEP FREEZE operations:

USS ARNEB (AKA-56)	I II III IV 60 61 62 63	
USNS WYANDOT (T-AKA-92)	I II III IV 64 65	(formerly USS WYANDOT)

SHIPS

VICTORY Class

TYPE: Cargo ship, unlimited service, VC2-S-AP3, "Victory Ship" hull.

CONSTRUCTION: Single deck, partially reinforced hull, and raised forecastle. Machinery and pilot-house are amidships.

SPECIFICATIONS:

Length:	455 feet (overall)	Displacement:	12,450 tons	Screws:	1
Beam:	62 feet	Propulsion:	Steam turbine	Horsepower:	8,500
Draft:	24 feet	Cargo Capacity:	8,500 tons (varies)		

VICTORY class ships which have participated in DEEP FREEZE operations:

USNS GREENVILLE VICTORY (TAK-237)	I	II	III		61				
USNS PVT. JOSEPH F. MERRELL (TAK-275)		II				62	63	64	65
USNS PVT. JOHN R. TOWLE (TAK-240)			III	60	61			64	65

LIBRARY

TANKERS

ALATNA Class

TYPE: Bulk-petroleum carrier suitable for transporting oil, aviation gas and motor fuel. Ship is designated T1-MET-24a.

CONSTRUCTION: Single deck with raised forecastle and poop, machinery and pilot-house are located aft. Ships have ice pilot station, helicopter deck, and ice-strengthened bows.

SPECIFICATIONS:

Length:	302 feet (overall)	Displacement:	5,720 tons	Screws:	3
Beam:	61 feet	Propulsion:	Diesel Electric	Horsepower:	2,530
Draft:	26 feet	Cargo Capacity:	30,000 bbls.		

ALATNA class ships which have participated in DEEP FREEZE operations:

USNS ALATNA (TAOG-81) IV 60 61

USNS CHATTAHOOCHEE (TAOG-82) 62 63 64 65

PATAPSCO Class

TYPE: Fuel transporter, various grades and types of fuel.

CONSTRUCTION: Single deck with raised forecastle and poop, pilot house located forward.

SPECIFICATIONS:

Length:	311 feet (overall)	Displacement:	4,335 tons	Screws:	2
Beam:	49 feet	Propulsion:	Diesel Electric	Horsepower:	2,100
Draft:	16 feet	Cargo Capacity:	2,100 tons (55,400 gal. oil; 710,000 gal. gas)		

PATAPSCO class ships which have participated in DEEP FREEZE operations:

USS ELKHORN (AOG-7)	62
USS TOMBIGBEE (AOG-11)	63
USS NESPELEN (AOG-55)	I II III IV

ENDEAVOUR

HMNZS ENDEAVOUR (ex-USS NAMAKAGON, AOG-53), a PATAPSCO class ship, has assisted the U.S. operations during DEEP FREEZE in 1963, 1964, and 1965.

PICKET SHIPS

USS EDSALL Class

TYPE: Radar Picket Escort Vessel

CONSTRUCTION: Converted destroyer escort fitted with radio-electronic gear for use on early-warning system deployment. Equipped for control and guidance of aircraft.

HMNZS LOCH Class

Anti-submarine Frigate

Ships were built by the British and transferred to New Zealand Navy. Detailed construction data are not available.

SPECIFICATIONS:

Length:(overall)	306 feet	307 feet
Beam:	37 feet	38 feet
Draft:	11 feet	14 feet
Displacement:	1,850 tons	1,435 tons
Propulsion:	Diesel Electric	Reciprocating
Screws:	2	2
Horsepower:	6,000 hp	5,500 hp

Picket ships which have participated in DEEP FREEZE operations:

USS BROUGH (DE-148)	II	III	IV		
USS PETERSEN (DE-152)				60	
USS WILHOITE(DER-397)				61	
USS VANCE (DER-387				62	
HMNZS ROTOITI		62	63	64	
USS DURANT (DER-389)				63	
USS FORSTER (DER-334)				63	
USS HISSEM (DER-400)				64	
USS MILLS (DER-383)				65	
HMNZS PUKAKI			64	65	

Above: LOCH class

Right: EDSALL class

SPECIAL PURPOSE SHIP

ELTANIN Class

TYPE: Cargo vessel with special mission adaptation.

CONSTRUCTION: Specially strengthened hull for work in ice, an icebreaker bow, an enclosed look-out on forward mast and a forward pilot station. The superstructure is aft.

SPECIFICATIONS:

Length:	262 feet (overall)	Displacement:	4,942 tons	Screws:	2
Beam:	52 feet	Propulsion:	Diesel Electric	Horsepower:	3,200
Draft:	19 feet	Cargo Capacity:	1,300 tons		

ELTANIN class ships which have participated in DEEP FREEZE operations:

USNS MIZAR (TAK-272) 62
USNS MIRFAK (TAK-271) 63
USNS ELTANIN (TAK-270) 63 64 65

SPECIAL NOTE: In 1961 the USNS ELTANIN (TAK-270) was modified to provide the National Science Foundation a scientific research ship which would be capable of independant operation. The ship is operated by the U. S. Military Sea Transport Service (MSTS) for the Office of Antarctic Programs, National Science Foundation.

DEEPFREEZE Ship Summary

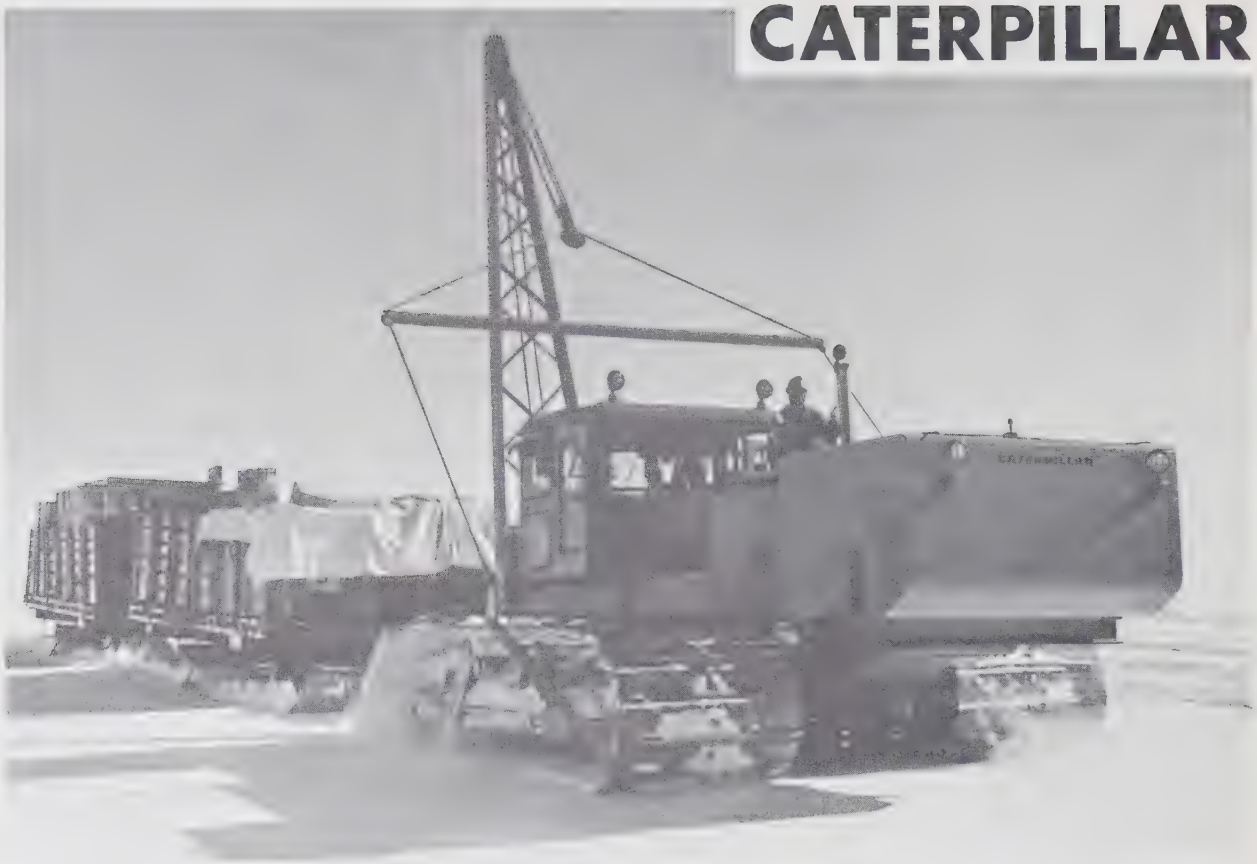
TABLE OF SHIP PARTICIPATION

SHIP	DF I	DF II	DF III	DF IV	DF 60	DF 61	DF 62	DF 63	DF 64	DF 65
ALATNA, USNS				X	X	X				
ARNEB, USS	X	X	X	X	X	X	X	X		
ATKA, USS		X	X		X		X		X	
BROUGH, USS		X	X	X						
BURTON ISLAND, USS			X		X		X		X	
CHATTAHOOCHEE, USNS							X	X	X	X
CURTISS, USS*		X								
DURANT, USS								X		
EASTWIND, USCGC	X				X	X	X	X	X	X
EDISTO, USS	X			X		X		X		X
ELKHORN, USS							X			
ELTANIN, USNS								X	X	X
ENDEAVOUR, HMNZS								X	X	X
FORSTER, USS								X		
GLACIER, USS	X	X	X	X	X	X	X	X	X	X
GREENVILLE VICTORY, USNS	X	X	X			X				
HISSEM, USS									X	
MERRELL, PVT. JOSEPH F., USNS		X					X	X	X	X
MILLS, USS										X
MIRFAK, USNS								X		
MIZAR, USNS							X			
NESPELEN, USS	X	X	X	X						
NORTHWIND, USCGC		X		X						
PETERSEN, USS					X					
PUKAKI, HMNZS									X	X
ROTOITI, HMNZS							X	X	X	X
STATEN ISLAND, USS		X		X		X		X		X
TOMBIGBEE, USS								X		
TOWLE, PVT. JOHN R., USNS			X		X	X			X	X
VANCE, USS							X			
WESTWIND, USCGC			X							
WILHOITE, USS						X				
WYANDOT, USNS	X	X	X	X					X	X

* The USS CURTISS (AV-4) was a seaplane tender used to transport personnel to McMurdo. This ship is not mentioned elsewhere in this publication.

VEHICLES

CATERPILLAR



D8 LGP

Manufactured by the Caterpillar Co., Peoria, Illinois, the "CAT" family has been an essential part of the Antarctic effort. Providing specially designed low-ground-pressure D-8 tractors with an exaggerated track width and an extended frame, the Caterpillar Co. satisfied an essential requirement for an overland transporter on the early traverses. Today there are many types of "CAT" items in inventory. Equipped with blades, buckets, and forks, these vehicles are used for handling cargo, filling sno-melters, compacting runways, and towing sleds. Operating in temperatures as low as -65°F., the "CAT" is a workhorse at all Antarctica stations.

D4 D8

SPECIFICATIONS:	D2 LGP	D4	D8	D8 LGP	D9	944	955	955 LGP	966
WIDTH: with/ w/o attachment	N/A 9' 6"	6' 6" 8' 0"	9' 1" 12' 9"	13' 8" 16'10"	10' 0" 13' 5"	8' 0" 8' 0"	6' 8" 6' 8"	13' 4" 13' 4"	8'11" 8'11"
HEIGHT: with/ w/o cab	8' 6" 5' 2"	9' 6" 5' 9"	10' 8" 7'10"	10' 8" 7'10"	9' 2"	9' 4" 6' 9"	10' 4" 7' 1"	10' 4" 10' 4"	9' 8" 7' 1"
LENGTH: with/ w/o attachments	13'10"	11' 0"	17' 1"	20' 7"	18' 0"	18' 4" N/A	15' 2" N/A	15'11" 11' 1"	22' 6" N/A
WEIGHT: w/o attachments	12,000 lbs	11,700 lbs.	47,462 lbs.	63,500 lbs.	64,400 lbs.	20,400 lbs.	24,000 lbs	25, 000 lbs.	28,800
SPEED: maximum MPH	5. 5 MPH	5. 5 MPH	5. 2 MPH	4. 5 MPH	6. 5 MPH	24. 0 MPH	24. 0 MPH	7. 0 MPH	24 MPH
GROUND PRESSURE:	3. 5 psi	10. 9 psi	10. 87 psi	4. 1 psi	12. 23 psi	N/A	N/A	4. 0 psi	N/A
ENGINE: model displacement horsepower)flywheel)	D311 252 cu. in. 43 hp	D330 350 cu. in. 65 hp	D342 1,246 cu. in. 235 hp	D342 1,246 cu. in. 225 hp	D353 1,473 cu. in. 385 hp	D330 350 cu. in. 105 hp	D330 350 cu. in. 100 hp	D330 350 cu. in. 100 hp	D333 525 cu. in. 150 hp
FUEL CONSUMPTION: (gallons/hour)	3-5	3-6	8-10	9-11	9-12	5-7	5-7	5-7	6-8
ATTACHMENT WEIGHT:	2,000 lbs.	2,400 lbs.	10, 000 lbs.	12, 000 lbs.	12,000 lbs.	1,450 lbs	1,000 lbs.	1,000 lbs.	2,000 lbs

NODWELL

Manufactured by the Robin-Nodwell Mfg., Ltd. of Calgary, Alberta, Canada, this family of vehicles is used as personnel carriers and as chassis for fire-fighting equipment. The RN-110 is used for fire fighting in a configuration called "fire boss", the RN-10 and the RN-75 are used principally as "taxi" vehicles. In general, the Nodwell family is capable of payloads ranging from 1,000 to 11,000 pounds or from 3 to 15 persons in a passenger configuration.

At right: A Nodwell RN-10 being discharged from the USNS PVT. JOSEPH F. MERRELL in Winter Quarters Bay at McMurdo Station.

SPECIFICATIONS:	RN-10	RN-75	RN-110
Width:	6' 6"	9' 1"	9' 1"
Length:	10' 5"	16' 8"	19' 3"
Height:	4' 9"	8'10"	8'10"
Weight: (pounds)	2,600	10,750	11,450
Speed: (MPH)	18	12	14
Range: (approx. miles)	75	80	60
Payload: Cargo pounds	1,000	7,500	11,000
Passengers	3	7-12	15
Ground Pressure: (psi loaded)	1.03	2.29	2.20
Fuel Consumption: (mpg)	7-8	2-3	1-2
Engine: Make	Ford 6cyl	Ford 6cyl	Ford V-8
Displacement	91	223	292
Width with tracks removed:	6' 6"	8' 6"	8' 6"

RN-110

RN-110 NSF Photo

THIOKOL Trackmaster

Manufactured by the Logan Division, Thiokol Chemical Corporation, Logan, Utah, the Trackmasters belong to the light, reconnaissance family of antarctic vehicles. The 4T2 and the 4T10 were used for transport on the pioneer trek from Byrd Station to Eights Station, a distance of over 800 miles. These vehicles provide limited capacity, local-area cargo and passenger transportation.

SPECIFICATIONS:	4T2	4T10	601
Width:	7'10"	7'10"	8' 1"
Height:	7' 0"	7' 4"	7' 0"
Length:	11'10"	12' 7"	13' 5"
Weight: (pounds)	4,410	5,060	5,540
Speed: (MPH)	35	35	25
Range: (approx. miles)	140	140	120
Payload: Cargo pounds @	2,400	800	None
Passengers	None	10	10
Ground Pressure (psi loaded) @	1.12	1.22	1.25
Fuel Consumption (mpg)	6-8	6-8	3-8
Engine: Make	Ford 6cyl	Ford 6cyl	Ford 6cyl
Displacement	223	223	233
Width with tracks removed:	5' 6"	5' 6"	5' 6"

@ with overload springs. Vehicle has additional 1,500 pound towing capability.

TUCKER Sno-Cat

The Sno-Cats are a product of Tucker Sno-Cat Corporation, Medford, Oregon. This is a unique vehicle in that it is propelled by ladder-tracked pontoons rather than by wheels or conventional track assemblies. The vehicles are manufactured in a number of sizes, with variable engine and body configurations. This was a principal vehicle used on the British Trans-Antarctic Expedition of Hillary and Fuchs in 1958. This vehicle is particularly useful in areas of soft snow. The U.S. Antarctic Research Program (USARP) scientists use the Sno-Cat extensively.

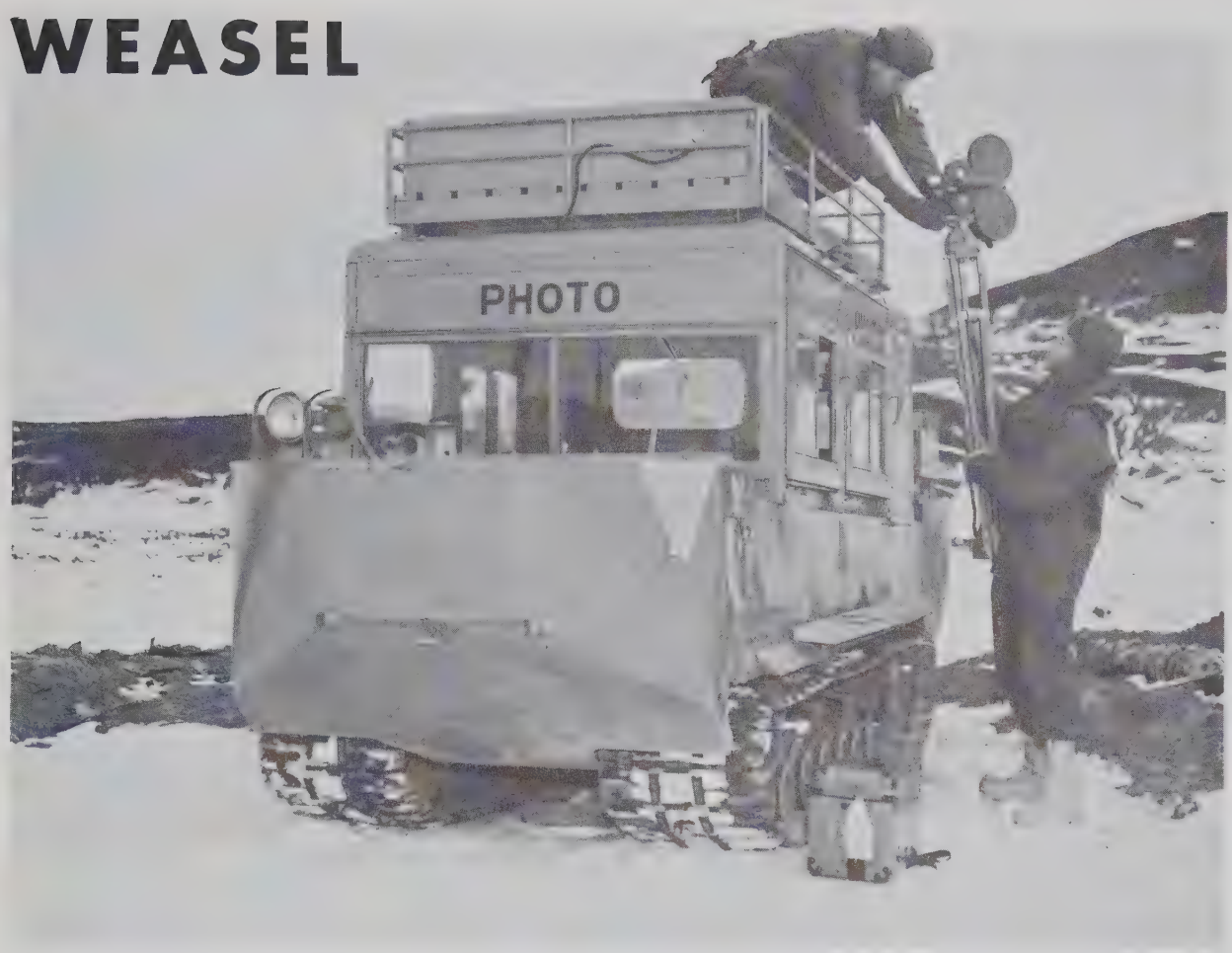
743

SPECIFICATIONS:	443A	743	843
Width:	6' 3"	7' 5"	9' 5"
Height:	7' 5"	7' 9"	10'10"
Length:	15'10"	20' 0"	25' 0"
Weight: (pounds)	4,200	7,200	21,000
Speed: (MPH)	15	15	17
Range: (approx. miles)	125	200	200
Payload: Cargo pounds	1,650	2,300	6,000
Passengers	6-8	15	N/A
Ground Pressure: (psi)	0.75 (light)	0.75 (light)	2.10 (loaded)
Fuel Consumption: (mpg)	4-6	2-4	1-4
Engine: Make	Chrysler 6	Chrysler V8	Cummins 6 (diesel)
Horsepower	115	180	175
Towing capability: (pounds)	2,500	6,000	15,000

443

843s

WEASEL



The "Weasel", either M29 or M29C, is one of the true "Polar Experts." Manufactured by Studebaker Corporation to satisfy World War II needs, this veteran has seen service on all major U.S. expeditions in the Antarctic as well as for expeditions and camp support by other nations active on the Antarctic Continent. The vehicle has not been manufactured since the mid-1940's and time has taken its toll of the "Weasel"; it is slowly disappearing from the scene. The M29 and its amphibian twin, M29C, have been reliable small transport for cargo and personnel and trail-marking vehicles over snow, ice and bare ground.

SPECIFICATIONS:	M29	M29C
Width: @	5' 1"	5' 7"
Length:	10' 6"	16' 0"
Height:	5'11"	5'11"
Weight: (pounds)	3,725	4,778
Speed: (MPH)	36	36
Range: (Approx. miles)	175	175
Payload: Cargo pounds	1,200	1,200
Passengers	3	3
Ground Pressure: (loaded psi)	2.10	1.91
Fuel Consumption: (mpg)	5	5
Engine: Make	Studebaker	
Displacement: (cu. in.)	170	

@ M29 has 15" tracks, the M29C has 20".

Polaris

NSF PHOTO

TOBOGGANS

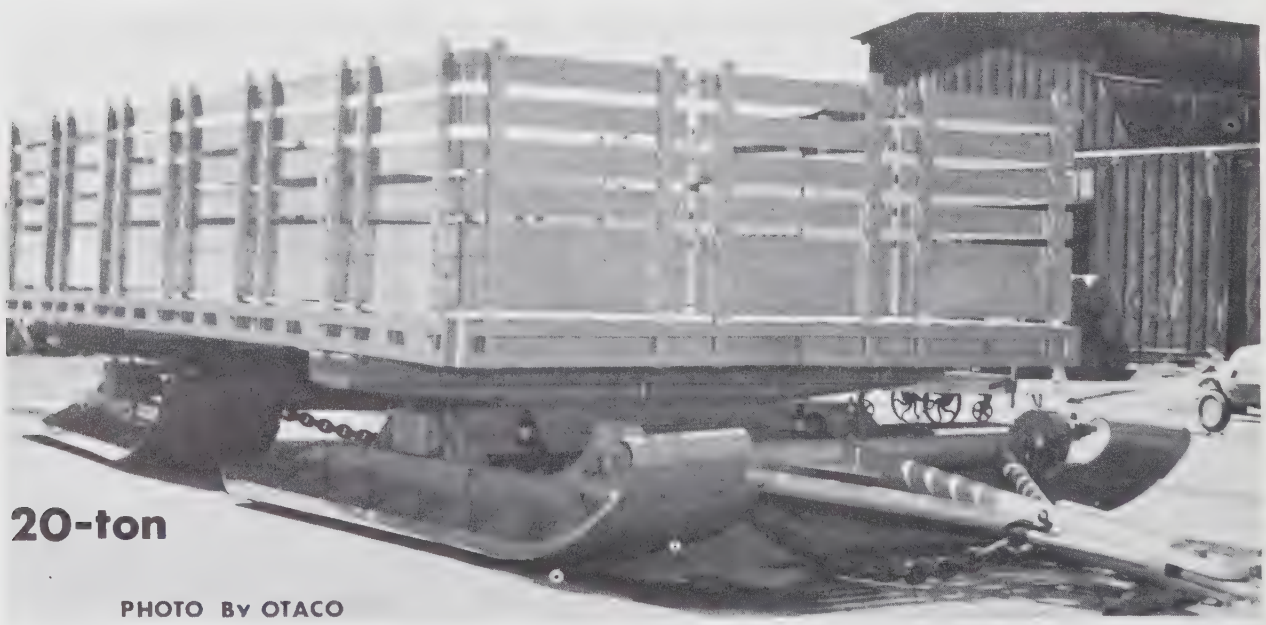
The motor toboggan is used primarily for field work by small scientific parties. Their ability to haul comparatively large loads and their ease of maintenance make them particularly adaptable for this type work.

SPECIFICATIONS:	Eliason	Polaris
Model:	K-12	Ranger
Length:	7' 9"	10' 4"
Width:	2' 9"	3' 0"
Weight: (pounds)	460	550
Speed: (max. MPH)	25	25
Engine:	Briggs&Stratton	Kohler
Horsepower:	9	9
Towed Payload:	1,000 lbs.	1,000 lbs.

SLEDS

There are many types of sleds in Antarctica, in sizes from 1-ton to 20-tons capacity. Among the most commonly used sleds are those built by Otaco Limited of Canada. The 10-and 20-ton Otaco sleds are used for port clearance, as aircraft loading/unloading ramps, and, prior to the introduction of air-landed supply of inland stations, as the freight-hauling, overland traverse workhorse.

SPECIFICATIONS:	10-ton	20-ton
Length:	22' 4"	24' 0"
Width:	8' 6"	12' 0"
Weight: (empty pounds)	9,000	20,000
Height to bed:	2'11"	2' 8"
Ground Pressure:(loaded psi)	5.6	7.1



20-ton

PHOTO BY OTACO

OTHER ITEMS

PETER PLOW

A Swiss-made rotary snowplow, the 15-ton Peter snow-milling machine is capable of clearing a path 4' deep and 8' wide at speeds up to 3 MPH depending on snow conditions. Trenching is accomplished by making repeated cuts.

WONDER-ARCH

The Wonder-Arch has been a major factor in recent inland station design and construction. Pioneered at Camp Century in Greenland, the Wonder-Arch has been used at Byrd, Pole and Eights Stations.

Using a movable erection bridge, SeaBees begin assembling the steel arches over a Byrd Station trench. The erection tower moves on rails along the sides of the trenches.

The Peter snow-milling machine is used to backfill snow on the Wonder-Arches. This compacted snow-roof acts like an arch and supports some of its own weight.

After completing the arch construction, installation of buildings is accomplished according to a master construction plan. This building is a Jamesway shelter at Byrd Station.

Wonder-Arches are used to provide support in instances other than original trench construction. Here arches are being placed over Eights Station buildings which have been covered with accumulated snow.

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